



Washington Park ARBORETUM BULLETIN

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Concerning This Issue . . .

Summer's end—once thought to be the continuation of gardening chores and the diminution of garden color.

Right on the first count only: timely tips on garden irrigation start with an article by Arboretum horticulturist Christina Pfeiffer and weave their way through other articles in this issue. But, instead of dampening a dampened garden, this issue also emphasizes that late summer can herald new color and enhanced creativity.

“Shifting to Water-Sensitive Gardens,” by *Sunset Magazine*’s Jim McCausland, reminds us that color and low-water maintenance go together. And former *Sunset* staffer, Nancy Davidson Short, leaves us with the thought to “run for the border”—Bellevue Botanical Garden’s mixed border, which is only more beautiful as summer merges into autumn.

Gerald Straley, long-time friend of the Arboretum from his position at the University of British Columbia, has prepared a beautiful and colorful story on little-known Asian perennials that are best used in the garden for their leaf.

The above articles—in fact, all *Bulletin* articles—use horticultural terms—sometimes complicated, sometimes merely Latin. For many years we have offered glossaries with each article. Now we are experimenting with recommending other sources for those interested in pursuing definitions. Valerie Easton, librarian at the Center for Urban Horticulture’s Elisabeth C. Miller Library, has prepared information to help you find resources to have at hand as you read horticultural publications. Brian O. Mulligan, director emeritus of the Washington Park Arboretum, and Sarah Hayden Reichard, doctoral candidate at CUH, offer book reviews on two other gardening resources.

At the beginning of this issue, Arboretum Foundation President Duane Kelly updates us on the activities during fiscal year 1993-1994, and explains the donations made by The Arboretum Foundation to Arboretum maintenance and enhancement. Arboretum Director John Wott expands his quarterly column, as well, to bring us information about Arboretum events, progress, and maintenance.

We thank *Sunset* for the talents of McCausland and Short, in addition to the privilege of adding Northwest Bureau Chief Steven Lorton to the new advisory position on the editorial board. In addition, we have two new board members. Susie Marglin, extraordinary in gardening and advertising sales capacities, officially joins the board this summer. So does Arthur Kruckeberg, professor emeritus of botany, University of Washington, and well-known author and plant expert. We are fortunate that talents such as these are available to us in the Washington Park Arboretum.

Jan Silver, Editor
The Washington Park Arboretum Bulletin



Make a run for Bellevue's mixed border, page 10.



Water-sensitive gardens, page 18.

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Find plants on view in the Washington Park Arboretum in the newly revised *The Woody Plant Collection in the Washington Park Arboretum*, available in the Graham Visitors Center gift shop.

Cover: *Aster × frikartii* 'Mönch' with *Hemerocallis* 'Buttercurls', an outstanding combination in the Bellevue Botanical Garden mixed border. Photo by Lynne Harrison.

The Washington Park Arboretum Bulletin is published quarterly as a bonus of membership in The Arboretum Foundation. The Arboretum Foundation is a non-profit organization that was chartered to further the development of the Washington Park Arboretum, its projects and programs, by means of volunteer service and fund raising. The Washington Park Arboretum is administered through cooperative efforts between the University of Washington, its Center for Urban Horticulture (CUH), and the City of Seattle Department of Parks and Recreation. The programs and plant collections are a responsibility of the Center for Urban Horticulture.

The mission of The Arboretum Foundation is to ensure stewardship for the Washington Park Arboretum, a Pacific Northwest treasure, and to provide horticultural leadership for the region. This stewardship requires effective leadership, stable funding, and broad public support.

Articles on gardening and horticulturally related subjects are welcome. Please call the *Bulletin* for guidelines. For permission to reprint any part of the *Arboretum Bulletin*, please contact The Arboretum Foundation. © 1994 The Arboretum Foundation. ISSN 1046-8749.

Information

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CUH: (206) 543-8616 or 685-8033. Request information about our public education programs.

The Arboretum Foundation: (206) 325-4510. Become a member and receive four issues of the *Bulletin*, 11 issues of the newsletter, plant sale catalogs, discounts, and early notice of programs and special events. Send payment to The Arboretum Foundation, University of Washington XD-10, Seattle, WA 98195.

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To Arboretum Foundation Members

David McDonald



Duane Kelly, President
The Arboretum Foundation

The President's Report: July 1, 1993-June 30, 1994

This year's annual June meeting marked the 60th anniversary of The Arboretum Foundation, a non-profit organization that was chartered "to further the development of the Washington Park Arboretum, its projects and programs, by means of volunteer service and fund raising." As members, we are continuing the growth of an important legacy that was planted in 1935.

For six decades we and our predecessors have protected, nurtured, and helped fund the 200-acre Washington Park Arboretum, which has become a true treasure of the Northwest. We owe a large debt of gratitude to those who have gone before us in the Foundation, and particularly to those forward-thinking founders in 1935. Without their vision and dedication back then, it is doubtful whether there would even be an arboretum now.

This has been an eventful year for The Arboretum Foundation, with major developments:

- After much soul-searching, we hired an executive director for the first time in our history to bring professional management to an organization that is growing and that faces many challenges.
- We thoroughly reviewed the financial and management aspects of this *Bulletin*, with the principal result being an affirmation of its present format.
- After holding the spring plant sale off site for the past three years, it was transformed into the successful Uncommon Trees and Shrubs Sale and held in the Arboretum. A collective sigh of relief was heard from volunteers when it was announced that the sale would return to the Graham Visitors Center instead of to a University of Washington parking lot.
- During the summer of 1993, we conducted the first annual Pacific Gardens contest, sponsored by *The Seattle Times* (*Pacific Magazine*) and the Northwest Flower and Garden Show. There were about 200 entries from Pierce, King, and Snohomish Counties in 1993 and even more interest this year for the 1994 contest. Gardens were judged by Arboretum Foundation volunteers.
- We had a successful year-end appeal in 1993 for donations, initiated by our new executive director, Debra Holland. As a result, \$53,000 was raised to restore four ponds in the Arboretum. This restoration has already begun and hopefully will be completed by the end of 1994.
- We gave direct support toward the management of the

Joy Spurr



Uncommon Trees & Shrubs Sale: Back at the Arboretum and a huge success.

Joy Spurr



Pond 2, now being restored.

Joy Spurr



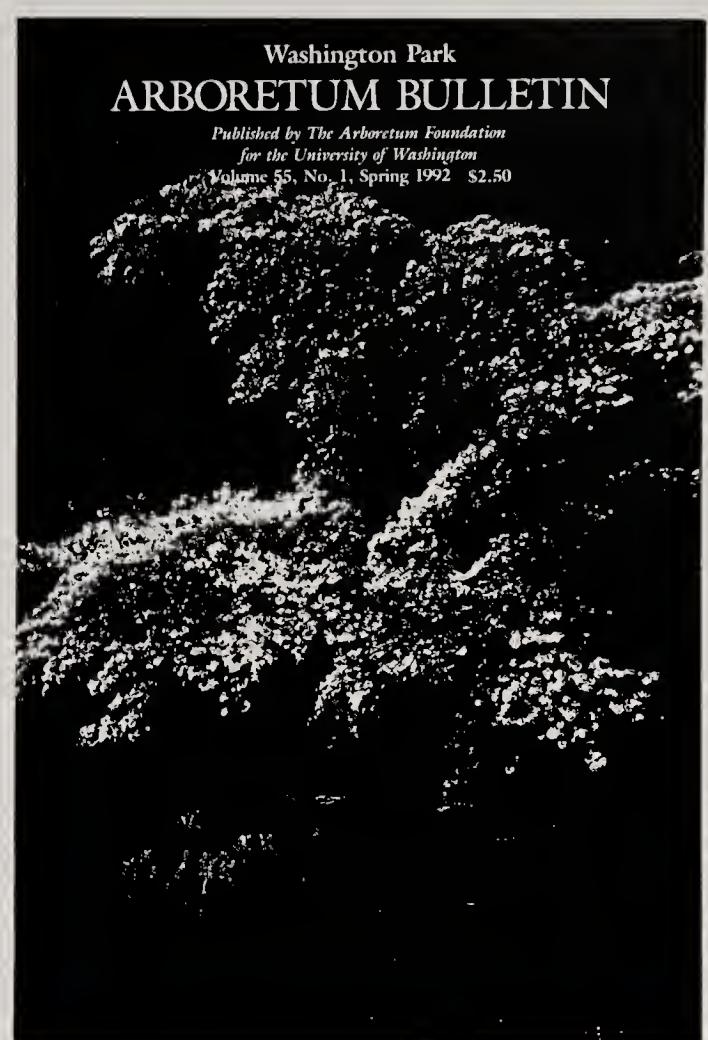
The Japanese Garden; see the new guide.

July 1, 1993, to June 30, 1994:

**Funds spent by The Arboretum Foundation
in direct support of the Arboretum**

Description	Amount spent (rounded to nearest \$)
Plant distribution	1,165
Plant identification	17,016
Propagation equipment, supplies, & facilities	379
Documentation equipment & supplies	441
Maintenance equipment & supplies	218
Publication of Arboretum collections catalog (special donation + additional amount from AF fund)	27,029
Guide to Japanese Garden	1,842
Trail map	8,000
Maintenance of Winter Garden	6,099
New Zealand Garden	50
Tour Programs	3,862
Temporary displays	1,100
Elisabeth C. Miller Library at CUH	4,000
Pest management tools	3,111
Upgrade of polyhouse at CUH	3,027
Propagator training on grafting	251
Membership, North American Plant Consortium	1,582
Building facilities	26,411
Maintenance for GVC	3,500
General operations	1,994
General personnel development	7,606
Salaries (supplement to state salaries)	30,713
Special Gifts	
Memorial gardens maintenance	3,000
Witch hazel collection (UC)	1,008
Mountain ash collection (UC)	500
New winch	184
Arborist program (supplies, salary)	50,000
Miscellaneous funds	10,390
Total amount spent, fiscal year 1993-1994	\$214,478

Abbreviations: AF, The Arboretum Foundation; CUH, Center for Urban Horticulture; GVC, Graham Visitors Center; UC, gift of the Unit Council of The Arboretum Foundation.



*The Washington Park Arboretum
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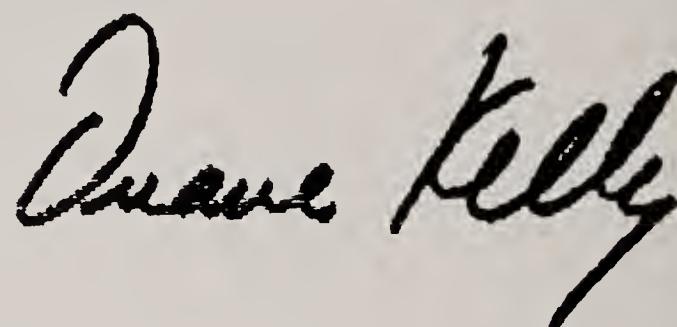
Arboretum for fiscal year July 1, 1993, to June 30, 1994; see the table for an explanation of how expenditures were made. Foundation dollars also support the Arboretum in many indirect ways.

In addition, many Arboretum Foundation volunteers donated time to ongoing committees, projects, units, and events. This entailed countless thousands of volunteer hours, without which the Foundation could not come close to fulfilling its mission of ensuring stewardship for the Arboretum and providing horticultural leadership for the region.

I would like to update you on an exciting ongoing process. Over the last several years, we have been advocating for a new master plan to guide the Arboretum's future. As a result, in June the Seattle City Council authorized the plan's first phase, entailing a community assessment to define the scope of the plan. The Arboretum Foundation committed up to \$60,000 from the

1994-1995 budget to fund this initial phase, which will be completed by December 31, 1994. A new master plan is critical for the Arboretum's future health and vitality.

Sixty years from now it will be 2054. Our vision and dedication today ensures that there will be a world-class arboretum for our descendants to enjoy six decades hence. Thank you to all Arboretum Foundation members who helped make 1993-1994 such a productive year.



Duane Kelly, President,
The Arboretum Foundation

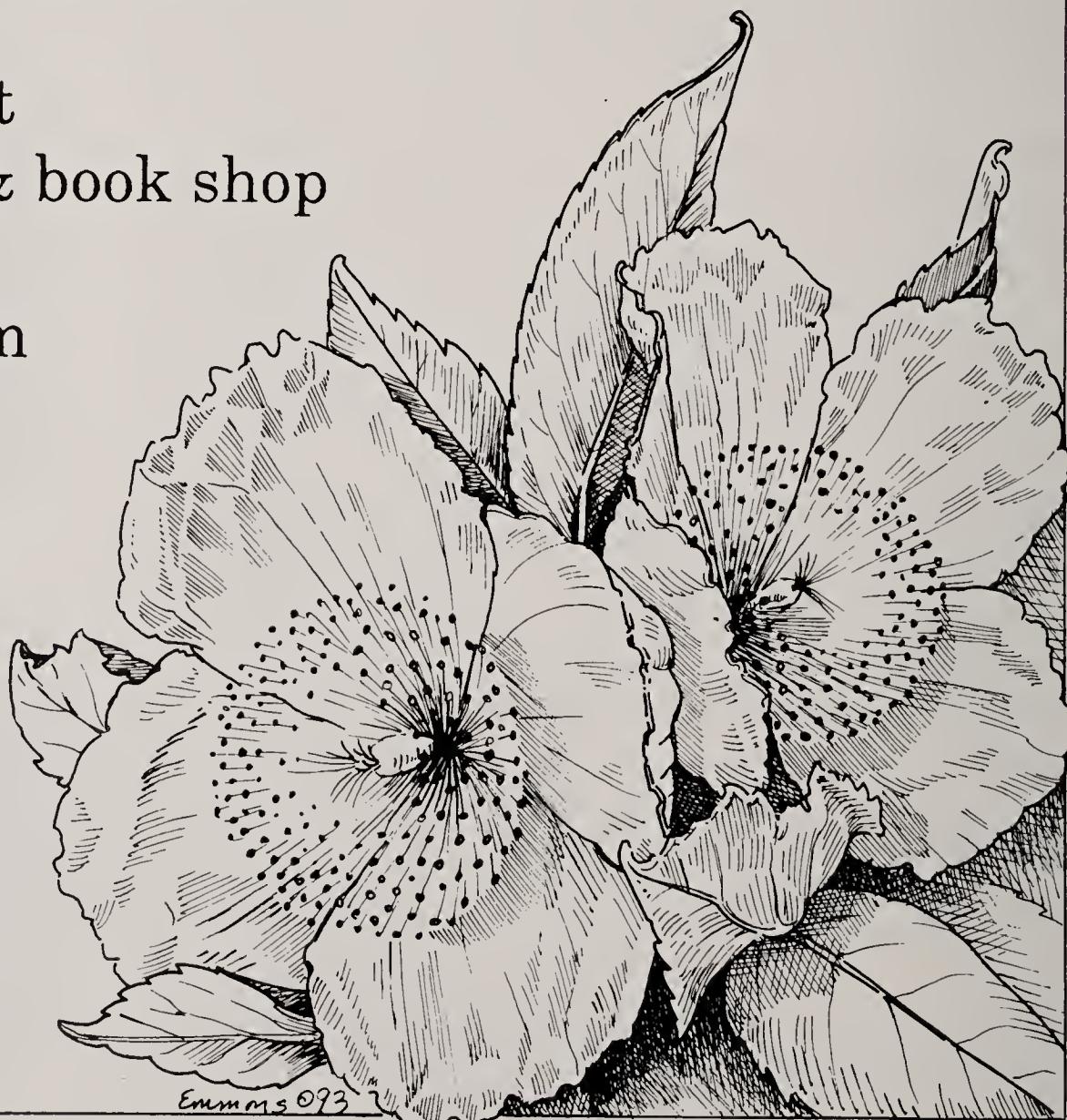
To obtain a full copy of the financial report, contact Debra Holland, Executive Director, The Arboretum Foundation, XD-10, University of Washington, Seattle, WA 98195; (206) 325-4510.

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To determine if you have watered enough, take soil from a few inches below the surface and squeeze. Arboretum crew member Annemarie Bilotta shows (upper right) that if it holds together, there is enough moisture.

Managing Moisture in the Garden

by Christina Pfeiffer

Through years of experience, the Arboretum has found that it is best to mulch early in the season and then water deeply and infrequently to establish plants that survive drought and stress.

By the end of summer, it can get really dry in Northwest gardens. The heat hits hard. You see plants wilting. Quick, grab a hose and wet them down....

Managing moisture in the garden can be a challenge. Don't wait until you see your favorite plants wilt to think about watering. There are

several easy things you can do to make the wisest use of water and to protect your plants from drought stress. Here are some of the techniques used in managing irrigation for the woody plant collections in the Arboretum that you can apply to your garden.

Water Early in the Season

The greatest demand for water is in the early summer when growth is most active. So it is best to concentrate your summer watering efforts early in the season. Identify the water needs of the different plants in your garden (amount, frequency), and water accordingly. Larger, established woody plants may only need to be soaked a few times, while new plants should receive deep soakings regularly during the first few years of establishment.

A coarse mulch, such as wood chips, will increase available soil moisture by depressing weed growth, reducing evaporation from the soil surface, and aiding good penetration when water is



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applied. Apply mulch early in the spring; the soils will retain moisture much longer into the summer. If you can do nothing else, mulch!

Look Beneath the Surface

Water before the soil becomes too dry, and wet it to a depth of several inches. To determine moisture retention, it is important to check below ground. A mulched soil may look dry at the surface but still be fairly moist beneath. On the other hand, the surface could be damp and the soil beneath bone dry. Find out by using a trowel to get a handful of soil several inches below the surface. Squeeze it. If it is somewhat damp but does not hold together, it is a good time to water. Check the soil again after watering to see how deeply it has soaked in. You may be surprised.

Water for Long, Deep Drinks— Not Just a Sip!

A dry soil surface can be next to impossible to penetrate. The water just beads up and runs off. When this happens, you can use a wetting agent to break the surface tension and pre-wet the soil before watering. About a tablespoon of dish soap per gallon or a commercial wetting agent, such as Aqua-Grow, should do the trick. The solution can be applied using a watering can or a hose-end sprayer or Hozon syphon connector. Whichever method and solution you use, remember to water deeply.

Water in the Rain

Better yet, take advantage of the cloudy, drizzly days we get each summer. Our summer rain is rarely adequate to wet the soil. But once the surface is damp, it is a great time to apply water and give the ground a good soaking. So, as crazy as it might look, watering on a "wet" day is smarter and more effective than watering on a hot, dry day.

Do not be deceived by a long string of cloudy days. Plants continue to grow and use water when it is overcast, perhaps even more so in this kind of weather. Some gardeners were deceived by the apparently damp season we had last year and did not water, only to find lots of water stress show up by the end of summer.

When Water Stress Hits

Symptoms of water stress evident at the end of the season include premature fall color and leaf drop, leaf scorch, and leaves that dry up and hang on to the branches. When these severe symptoms appear, it is a good idea to water to relieve the immediate stress and start planning strategies for next year.

Thinking Ahead

The end of the season is a good time to review the condition of your garden along with your watering practices and make notes for next season. Look at plants that showed the greatest stress: Are they in the proper locations in terms of sun exposure and competition from other plants? Think about transplanting to a better location during the dormant season or maybe replacing them altogether with more drought-tolerant species.

Whatever your garden type or preference in irrigation equipment, you can use these few tips to improve the condition of your garden while making the best use of available irrigation water.

Christina Pfeiffer is the horticulturist of the Washington Park Arboretum.

Irrigation Strategies in the Washington Park Arboretum

With 200 acres and an average of 500 new plants put in each year, it is quite a stretch to keep Arboretum plantings watered.

The Arboretum has organized a program to keep the most vulnerable plants watered, using limited staff and watching water use. The staff uses an irrigation inventory, which emphasizes watering information on the last three years' new plantings as well as other plants requiring summer water. Each year, staff members update it, then time watering based on what they determine from inspections of the plants and soil.

An automatic system covers some plantings. New plants under the automatic stations may be hand watered if they need more moisture. Mulching is a priority to conserve moisture, according to Arboretum horticulturist Christina Pfeiffer, who recommends doing it early in the season. "By watering deeply and infrequently," she says, "our goal is to encourage strong, deep root development to get the new plants well established and less dependent on irrigation as they mature."

Even with the best efforts to prevent drought stress in the Arboretum, there are always wilting plants that need immediate attention. That is why the regular garden inspections to monitor plant conditions are so important.

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Understanding Horticultural Terms: Help for the Home Gardener

by Valerie Easton

Do you sometimes (or often) come across unfathomable Latin binomials (genus and species) as you are reading gardening books and magazines? In *How Plants Get Their Names*, Liberty Hyde Bailey says:

The system of binomial nomenclature is one of the best inventions of men. It is effective; it is beautiful in its simplicity.

However, simplicity and beauty are not the words that come to mind when stumbling over terms such as *Ocimum kilimandscharicum* or *Petroselinum crispum* when planning your herb garden. And what about trying to pronounce Latin names or spell them? After all, isn't Latin supposed to be a dead language? How do you key out a plant when unsure of the difference between dichotomous or cordate leaf shapes? Every time you visit a nursery or thumb through a seed catalog,

understanding of Latin names is a must.

Fortunately, there are many good books to help the home gardener with botany and taxonomic terminology. Keep a few of these at hand as you read, and soon the information hidden in these formidable Greek and Latin adjectives, such as *radicans* (rooting, especially along the stem), *foetidus* (ill-scented) or *pracecox* (precocious or very early) will not only become comprehensible but be extremely helpful in identifying and understanding the plant habit, culture, and origin.

Dictionary of Plant Names by Allen J. Coombes (Beaverton, OR: Timber Press, 1985) is one of the most useful reference books for any gardener's library. Its subtitle, "The pronunciation, derivation and meaning of botanical names, and their common-name equivalents," describes its useful contents. While not nearly as inclusive as *Know Your Common Plant Names* (below), terms are arranged conveniently in one alphabetical listing and include useful (although British) pronunciation guidelines. An amazing amount of information in a small, inexpensive volume makes this the first book to buy, and it is especially helpful for beginning gardeners.

Know Your Common Plant Names by Brian Davis and Brian Knapp (Newbury, England: MDA Publications, 1992) is a useful first step in sorting out plant names. An extensive list of near-



From *A Dictionary of Botany* by R. John Little and C. Eugene Jones.

variegated. Descriptive of leaves which lack chlorophyll in certain sections, thus appearing yellowish or white; also in reference to flowers, seeds, etc. in which pigmentation is not uniform in intensity. (See fig. V-1.)

ly 500 pages, it gives common names with their botanical equivalents and vice-versa. So when your neighbor down the street gives you a start of what she calls sand toadflax, look here to find that the plant's Latin name is *Linaria arenaria*. Once properly identified, it is easy to find needed information about any plant. Each entry is marked with an identification code as to type of plant (conifer, annual, etc.), and the list of pseudonyms, which goes back at least ten years, will help with name changes.

Robert Gough, the author of *Glossary of Vital Terms for the Home Gardener* (New York: The Haworth Press, 1993) is clearly a gardener himself, as he ends his introduction with the advice, "When you come across an unfamiliar term, look it up here. Then go enjoy your plants." Over 1500 terms used by the home gardener, such as "pleach" and "WMV," are briefly and clearly defined. To encourage further study, basic reference works are cited with most entries. This little volume is especially useful for its thoughtful selection of terms ranging from older European words to those describing the most current scientific practices, and its no-nonsense definitions, as in "Weed: a plant growing out of place."

To delve more deeply into the meaning and origin of some 6000 botanical names, the gardener can turn to *Stearn's Dictionary of Plant Names for Gardeners* by William T. Stearn (London: Cassell Publishers Ltd., rev. ed. 1992). More than a dictionary, this book is a discussion of plant names by a scholar who obviously found their history and derivation endlessly fascinating. Why and how to use botanical names, what they mean, and the antiquity and inadequacy of common names are the subjects of lengthy essays preceding the listings.

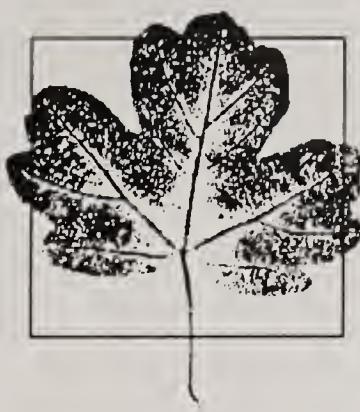
A remarkable array of facts can be learned from Stearn's listings, which not only include the definition of each term but also the story of the people involved. For example, *Euphorbia robbiae* found its way to England from Turkey in 1891 as rooted cuttings travelling in the hat box of Mrs. Mary Anne Robb on her way back to her home in Liphook, Hampshire, England. And Stearn's final definition: "Lexicographer: a writer of dictionaries; a harmless drudge that busies himself in tracing the original, and detailing the figuration of words."

For beautiful and clear illustrations of what many of these terms mean, gardeners of all ages can turn to *The Visual Dictionary of Plants* (New York: Dorling Kindersley, 1992). While no doubt

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meant for children, it is scientifically correct and thoroughly indexed, and no other book is so filled with fascinating photographs. You are not likely to forget that a *Nepenthes mirabilis* (monkey cup) is carnivorous when you see a cross section showing a digestive gland filled with insects; the complexity of pollen grains, anthers, and calyx integral to wind-pollinated reproduction; or the curious life cycle of a fern when illustrated in photos and drawings. All plant parts and processes are magnified, dissected and explained visually—germination has never been so gorgeous!

Also Noted:

Bagust, Harold. *The Gardener's Dictionary of Horticultural Terms*. London: Cassell, 1992.

Little, R. John, and C. Eugene Jones. *A Dictionary of Botany*. New York: Van Nostrand Reinhold, 1980.

Mabberley, D. J. *The Plant Book*. Cambridge, United Kingdom: Cambridge University Press, 1987.

Neal, Bill. *Gardener's Latin: A Lexicon*. Chapel Hill, NC: Algonquin Books, 1992.

Bellevue's Beautiful Border

text by Nancy Davidson Short

color photos by Lynne Harrison

The Bellevue Botanical Garden

LOCATION: The main entrance is at 12001 Main St., Bellevue, Washington, an extension of Old Bellevue's Main Street, in Bellevue Parks and Community Services' Wilburton Hill Community Park (east of Highway 405 on the crest of Wilburton Hill).

OPEN: Dawn until dusk. The visitor's center is open from 10 A.M. to 6 P.M. No admission charge.

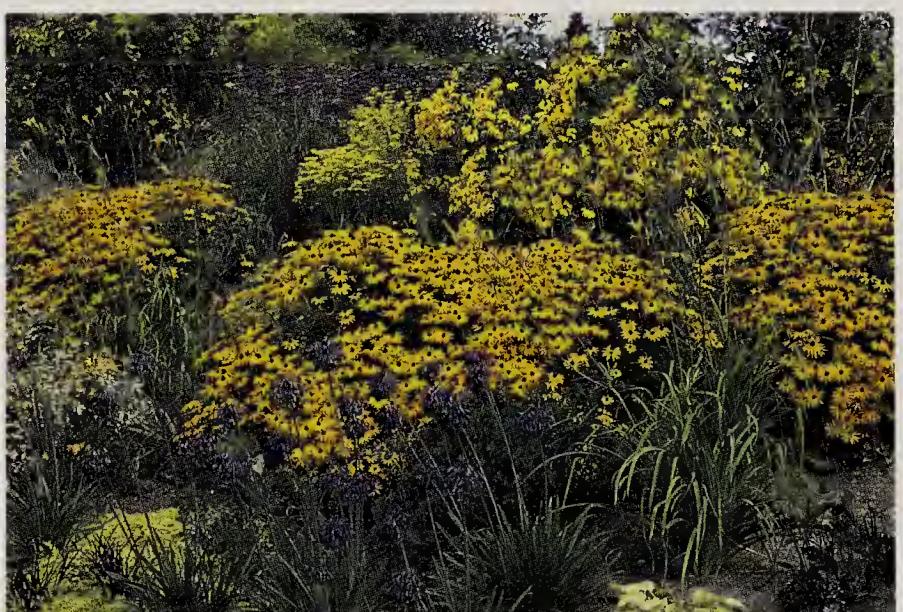
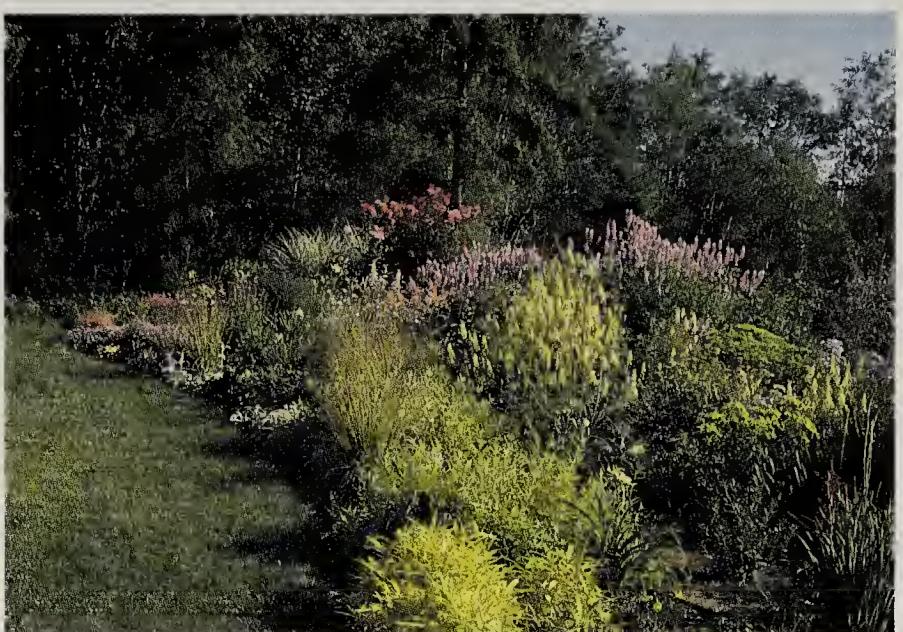
DIRECTIONS: From Interstate 405, take the NE 8th exit, eastbound. Turn right onto 120th to Main St., then left at the Botanical Garden parking lot.

SUPPORT ORGANIZATION: If you would like to be a part of the group that is "dedicated to making the Bellevue Botanical Garden a regional show place for pleasure and education," join the Bellevue Botanical Garden Society. The opportunities it offers volunteers to become involved and to make a difference are exciting. For information and docent-led tours, call (206) 451-3755.

DESIGNERS: Credit for the landscape design of the border goes to Northwest Perennial Alliance design committee members Charles Price, Glenn Withey, Bob Lilly, and Carrie Becker. In addition to designing the garden, members of the Northwest Perennial Alliance (NPA) collected the plants, planted them, and continue to assume responsibility for their care and for the constant addition of new plants.



Spikes of red lobelias jut out of yellow daylilies and pink *Geranium endresii* in Bellevue's beautiful border.



Clockwise from top left: *Lavatera 'Barnsley'*, *Hemerocallis 'Siloam Ribbon Candy'*, and *Astilbe 'Betsy Cuperus'*; Bellevue Botanical Garden's mixed border in 1993; *Kniphofia*, *Phygellius 'Winchester Fanfair'*, *Crocosmia 'Lucifer'*, and *Buddleia 'Dark Knight'*; *Agapanthus 'Bressingham Blue'* and *Rudbeckia 'Goldsturm'*; *Stachys 'Primrose Heron'* with *Molinia caerulea 'Variegata'*, an ornamental grass.



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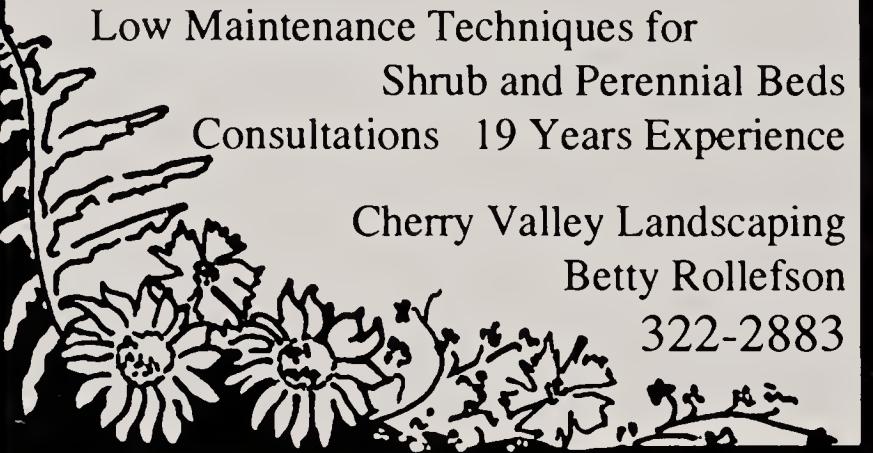


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Our Puget Sound region is famous for the exuberance of its spring gardens. Rhododendrons, azaleas, flowering cherry and plum trees, mats of rock plants in Easter egg colors, and daffodils, tulips, and primroses break into a crescendo of bloom in April and May. After that, most Northwest gardens lapse into cool green for the summer—but not the Bellevue Botanical Garden's 350 feet of mixed border. Though it, too, produces a handsome spring splash, a truly breathtaking show starts in June and continues into October.

For serious gardeners, this beautifully designed mixed border and nearby new shade garden are worth a special trip to see. Like a traditional English mixed border, the garden includes shrubs, trees, and grasses as well as perennials and even fill-in annuals, which play colors, leaf patterns, and textures against each other like a masterpiece of music.

Summer flowering shrubs and small trees provide structure and a backbone for the garden and give it geometry in winter. They were chosen not only for flowers but for foliage (often variegated), fruit, and stem or branch color. Fountaining clumps of grasses and silver-leaved perennials such as *Stachys byzantina* and *Artemisia absinthium* 'Huntington Garden' create transitions from ground covers to taller plantings.

Considered as a gardener's textbook, the border rewards study on several levels, including a primer on plant combinations, which are unusual and fascinating. One of the most talked about is on the border's south slope, carpeted in day-glow yellow *Lysimachia nummularia* 'Aurea'. Tufts of near-black *Ophiopogon planiscapus* 'Nigrescens' (black lily turf) poke up through it, as do clumps of *Viola* 'Black Magic'. Beyond this grouping, the tumbling golden grass of *Carex stricta* 'Bowles Golden' leads into the brilliant brassy glow of the *Rudbeckia* collection and equally dazzling *Kniphofia*, the red-hot poker plant.

A little further along, a tall clump of green-and-white striped grass, *Miscanthus sinensis* 'Variegatus', is a foil for fragrant white *Phlox paniculata* 'Mt. Fuji'. A cloud of pink *Lavatera* 'Barnsley' in the background complements a coral-colored day lily, *Hemerocallis* 'Siloam Ribbon Candy', at its feet.

Among the familiar favorite plants you will see, it is exciting to come across new varieties and species. Since the setting is a botanical garden, it seems proper to weave among the collections of perennials different varieties and selections of the

same species. For example, there are six varieties of *Agapanthus* (lily-of-the-Nile), seventeen different Michaelmas daisies, fifteen assorted astilbes, and a half-dozen barberries. The list of daylily varieties takes up a full page on the plant list, and there are nearly thirty named varieties of Siberian iris. So be sure to bring along a pencil and paper to jot down names and plant combinations. For help in identification, docents are often available. You can also pick up a plant list at the Shorts Visitors Center and while there use the reference books in the library maintained by the Bellevue Botanical Garden Society.

As you walk around and through the border, it continues to reveal itself—nuances of color from palest pink to wine red, blues merging into purples and pale yellows. Every week or two the main players change. As one perennial bows out, another seems ready to step in, offering even more mouth-watering combinations.

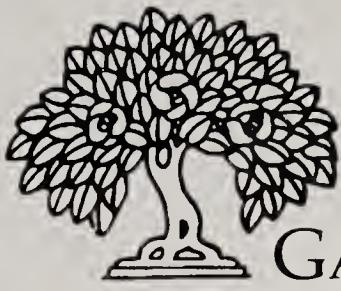
You will also see a demonstration of top-notch maintenance techniques, all done by volunteer members of the Northwest Perennial Alliance. Notice the inconspicuous staking, timely deadheading, summer pruning, weeding followed by moisture-conserving mulch—ideas to incorporate into your own garden.

Nancy Davidson Short is a freelance writer and a former staff member of *Sunset Magazine*. She belongs to The Arboretum Foundation.

Join the Northwest Perennial Alliance

To become a member of the Northwest Perennial Alliance, write to PO Box 45574, University Station, Seattle, WA 98145.

Donations and dues (\$15) may also be sent to this address. NPA is also looking for funds for plants, mulch and labeling.



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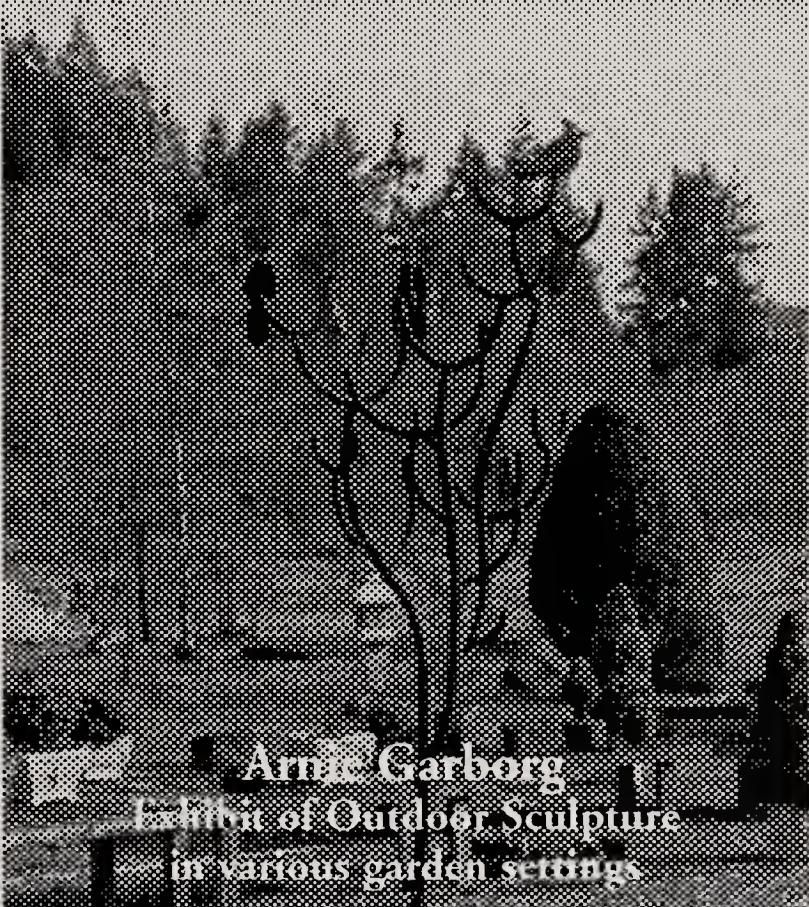
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Bold-Leaved Asian Perennials

photos and text by Gerald B. Straley

Not every garden can accommodate the perennials that are aggressively rhizomatous, whose stems grow along or under the soil to colonize in your garden. But, where there is room, they can be used to good effect. The Asian Garden at the University of British Columbia (UBC) in Vancouver is such a garden.

UBC's Asian Garden

UBC's Asian Garden comprises a 35-acre stand of mature mixed conifers, first developed in 1976. Situated on Point Grey, a peninsula of land jutting out into the Strait of Georgia, the garden enjoys a mild situation.

The major feature of the garden is a collection of rhododendrons, more than 400 different species, subspecies, varieties, and forms—one of the largest collections of the genus in North America. The high shade of the mature trees provides an ideal setting both aesthetically and culturally. Recently, there has been a concerted effort to accumulate large collections of other Asian trees, shrubs, and vines.

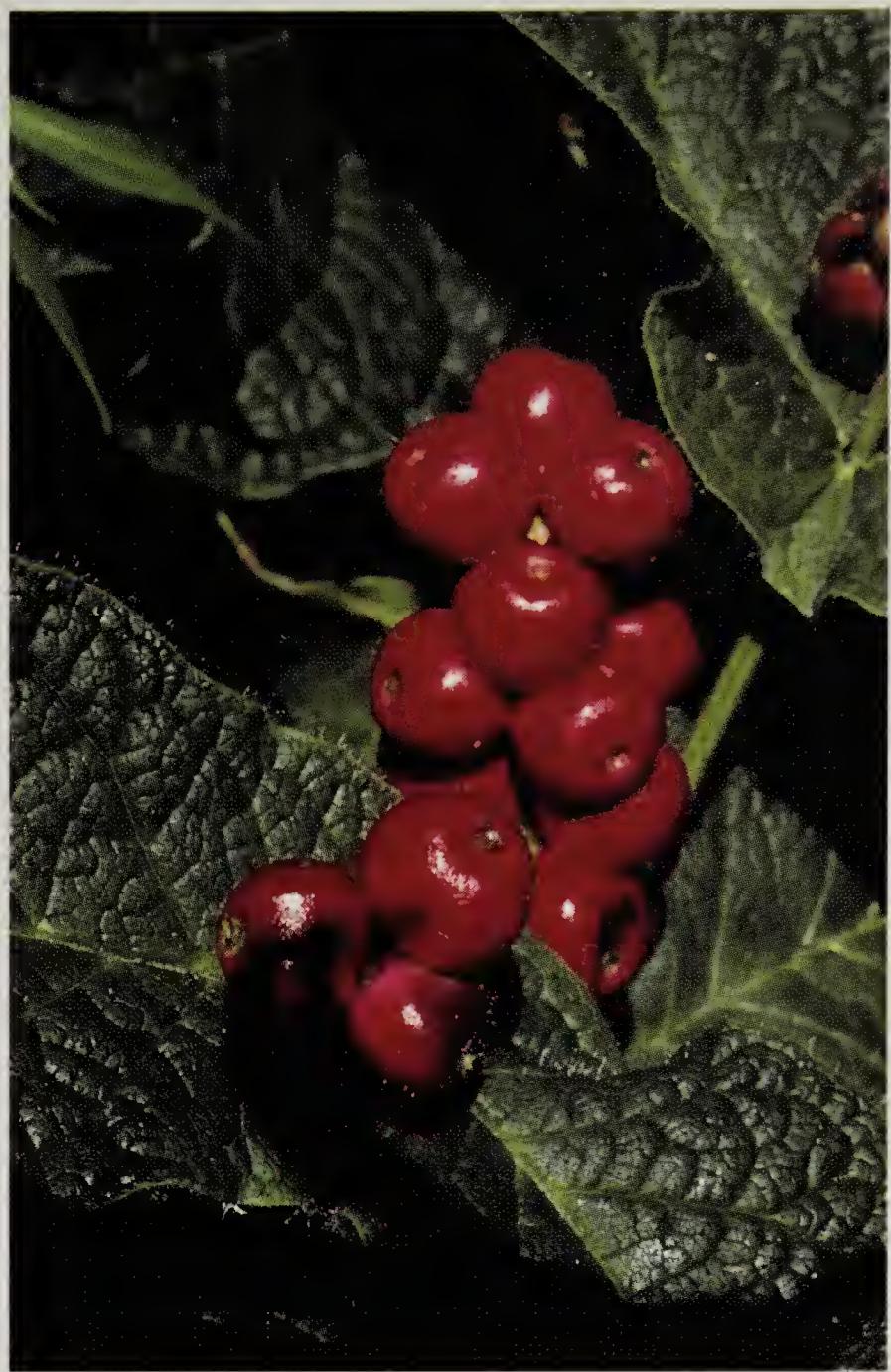
Unusual Underplantings

As the woody backbone of understory trees, shrubs, and vines has begun to mature, more emphasis has been placed on the herbaceous underplantings of bulbs and a wide variety of Asian perennials. *Hosta*, *Ligularia*, and *Primula* species are used in drifts along streams, in low areas, and around ponds. *Meconopsis* species, especially the Himalayan blue poppy (*Meconopsis betonicifolia*), *Iris*, *Lilium*, and the giant Himalayan lily (*Cardio-*



Above (left to right): *Lysichiton camtschatcense*, related to skunk cabbage, deserves more use. The beauty of *Syneilesis aconitifolia* is in its foliage.

Opposite (left to right): *Rehmannia elata*, relatively unknown in Pacific Northwest gardens, likes partial shade at UBC. *Triosteum himalayanum*, also a shade lover, has beautiful berries. (bottom) *Syneilesis palmata* is also grown for its decorative leaves.



crinum giganteum and other species), and *Hemerocallis* species occupy open sunny areas.

Bold-leaved plants are also used to good effect in the UBC's large garden, including most of the species of *Rodgersia*, *Astilboides tabularis*, *Peltoboykinia*, *Rheum*, and the unusual Asian species described below.

Petasites japonica

Under ideal conditions, the wild form of this Japanese member of the Compositae (daisy family) has leaves that almost rival those of *Gunnera*. The gray-green "umbrellas" may be 4 to 5 feet across. The flowers emerge very early in the spring, several weeks before the leaves begin to grow, one of the earliest of herbaceous perennials. In moist soil, these aggressive rhizomatous plants may form huge colonies.

The cultivated variety 'Variegata' is still invasive, but much more refined, with leaves that are less than half the size of the wild green form. When the leaves first emerge they are pale green, irregularly mottled with yellow or white and often with some purple or reddish overtones. As they mature during the summer, the purple is lost.

We have a planting along the edge of a pond where the rhizomes are above the water level, but the roots grow down into the wet. It is a very attractive plant if it has room to grow, but it is definitely not for the small garden.

Rehmannia elata

The genus *Rehmannia*, sometimes given the common name of Chinese foxglove, is relatively unknown in Pacific Northwest gardens, although *R. elata* is more commonly cultivated in the San Francisco area. There are some eight species, all native to China. Botanists are in disagreement as to the actual affinities of the genus. The flower characteristics are somewhat intermediate between the families Gesneriaceae (African violets and gloxinia are members) and Scrophulariaceae (figwort family).

Rehmannia elata has been surprisingly hardy, having been grown in the UBC Asian Garden for a number of years and having withstood near zero degrees F one recent winter. The form that we have reaches about 3 feet tall, with irregularly toothed leaves, up to 5 or 6 inches long, and progressively becoming smaller up the stems. The large *Gloxinia*-like or *Incarvillea*-like flowers are borne singly in the leaf axils, flowering from May or June until hard frost, one of the longest-blooming perennials at UBC. The flowers are large, up to 3 inches wide, with a distinct tube, flaring to

five petals of rosy pink, finely stippled with darker pink. Inside the tube is white with yellow streaks and large and small dots of dark purple. The flowers remind me somewhat of our native red monkeyflower, *Mimulus lewisii*.

Rhizomatous, although not aggressively so in our garden, it needs a rich, moist soil to grow best. Our plants are grown in partial shade. Southwestern British Columbia is probably near its northern limit. In colder climates, where it is not hardy, *Rehmannia elata* could be used in a cool greenhouse or conservatory. It is easily propagated by divisions, rhizome cuttings, or seed.

In his book, *Travels in China*, Roy Lancaster has photographs of another species, *Rehmannia glutinosa*, with reddish-brown flowers. He comments on it being common and even weedy in rock and wall crevices around Beijing, especially the Imperial Palace. I have not seen it in cultivation locally.

Lysichiton camtschatcense

Our native skunk cabbage or swamp lantern (*Lysichiton americanum*) is too common to be fully appreciated and is certainly not cultivated as often here as it is in Europe. Though rarely grown, the eastern Asian relative, *L. camtschatcense*, with its large white spathe, is considered much more desirable, at least in the moister areas of our gardens in the Pacific Northwest where it is a bit smaller and slower growing than our native species. Although preferring a moist, acidic soil in partial shade, *L. camtschatcense* will tolerate full sun, as long as the soil is wet, as in the edge of a pond.

Syneilesis aconitifolia and *S. palmata*

If only seen in late summer, I can imagine hearing that this is a genus with little or no garden merit. But, in spring when the leaves unfurl, it certainly has merit, at least for the larger garden.

Syneilesis is a genus of about five species from eastern Asia, which remains virtually unknown in Western gardens. In the Asteraceae (Compositae), they are considered closely related to *Ligularia*. However, they have a very different look, at least superficially.

The beauty of the plants is not in the flowers but in the foliage. All of the species have palmately compound leaves in which several leaflets radiate out from a common point like the stays of an umbrella. From early spring until fall, the leaves undergo changes, starting when the individual leaves push their way up through the ground, covered with white hair, looking like so many

shaggy-mane mushrooms. As they mature they lose the white hair and become dark green, with a bit of red-maroon in the center of the leaves. The leaves reach a foot or more above the ground.

The flowering stems are 3 to 4 feet tall, with flat-topped clusters of flesh-colored or pale purplish flowers, with a few small florets in each cluster, lacking any showy ray florets; in fact, the flowering stems are usually weak and fall over. It is best just to remove the flowering stems as they emerge above the basal leaves and just enjoy the showy basal leaves as a tall ground cover. They take on pleasant shades of yellow before dying back in late fall.

The UBC has grown two species of *Syneilesis* since 1984. They have short rhizomes, forming loose clumps. The leaves seem to remain at their best when grown in light shade.

Triosteum himalayanum

When I saw a seedling of this Asian perennial with its first flowers and fruits, I was taken back to my earlier encounter with its relatives that I knew in Virginia. This genus, a member of the Caprifoliaceae (honeysuckle family) is one of a great number of genera that are found in the wild in eastern North America and again in eastern Asia.

Triosteum himalayanum (*T. hirsutum*) is native in Uttar Pradesh in northern India and into southwestern China, growing in forests between 9000 and 12,000 feet. The clear, bright green leaves, clothed with long hairs, are very soft to the touch. But beneath these soft hairs are short glandular ones that look as though they were tipped with tar. They emit a very strong, foul, medicinal smell when bruised.

The lower leaves of *Triosteum himalayanum* are opposite and sessile, being attached directly to the stem, while the upper ones are broadly perfoliate—the leaf blade surrounds the stem and makes a good contrasting foil for the ripening fruits. The leaves are entire, with a puckered surface, and they are as much as 7 inches long and 6 inches wide.

Triosteum himalayanum has tubular greenish flowers less than an inch long that bloom in June and into early July and are produced in tight, elongated flower clusters (racemes); on the single main stem are attached individual flowers that are curved to one side, with a flaring mouth that is darker reddish brown inside. By late July or early August, these are followed by green fruits that gradually become brilliant red and shiny, sometimes with a blush of white on the shaded side,

when it puts on its best show for a few weeks. Reported to grow to about 18 inches tall in nature, our plants are 2 to nearly 3 feet tall, stretching taller, as do so many plants in the cool, wet Pacific Northwest. Stems get a bit floppy, sometimes from the sheer weight of the fruits, arching out from the center of the clump by late summer, especially in shade and wet, cool summers.

The fruits are true pulpy berries, with a few black seeds inside, and are attractive to varied thrushes, robins, and towhees in UBC's Asian garden. A photograph of the fruits in Roy Lancaster's *Travels in China* shows them as a rather dull reddish brown, and Roy tells me that this is an accurate representation of the fruits he has seen. He agrees that the color of the fruits on our plants in our Asian Garden are especially bright red and are produced in very long racemes.

Although we know little, as yet, on the tolerance of *Triosteum himalayanum* to a range of soil types, hardiness, and sun tolerance, it is an attractive plant for the shaded garden, the only drawback being the foul-smelling leaves. It has reseeded sparingly at UBC. Fresh seed will germinate readily after a cold treatment. The plant also may be propagated by divisions or vegetative stem cuttings early in the season. If taken later in the summer, the stems will have become somewhat woody and will not usually root.

Dr. Gerald B. Straley is Research Scientist and Curator of Collections, The University of British Columbia Botanical Garden, Vancouver, B.C.

Reference

Lancaster, Roy. 1989. *Travels in China—A Plantsman's Paradise*. Woodbridge, England: Antique Collector's Club.

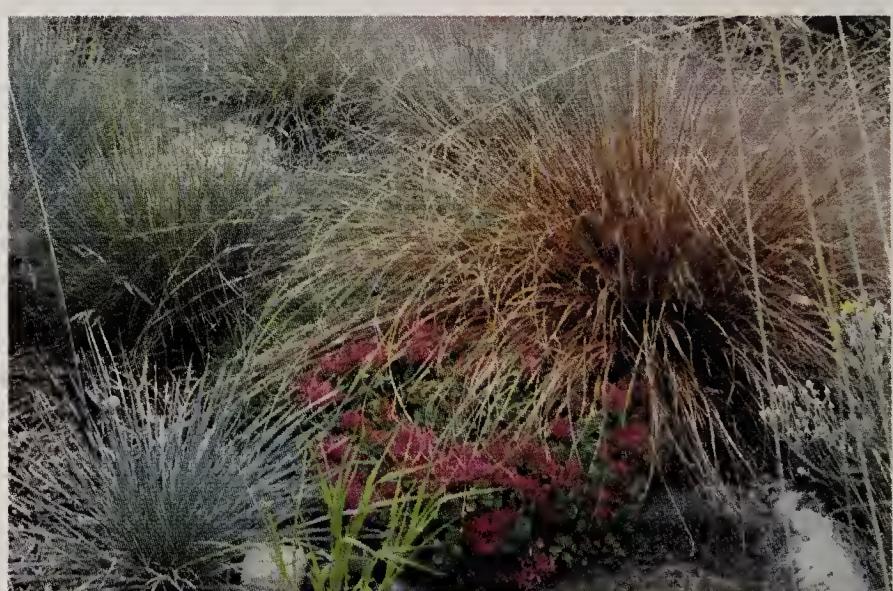
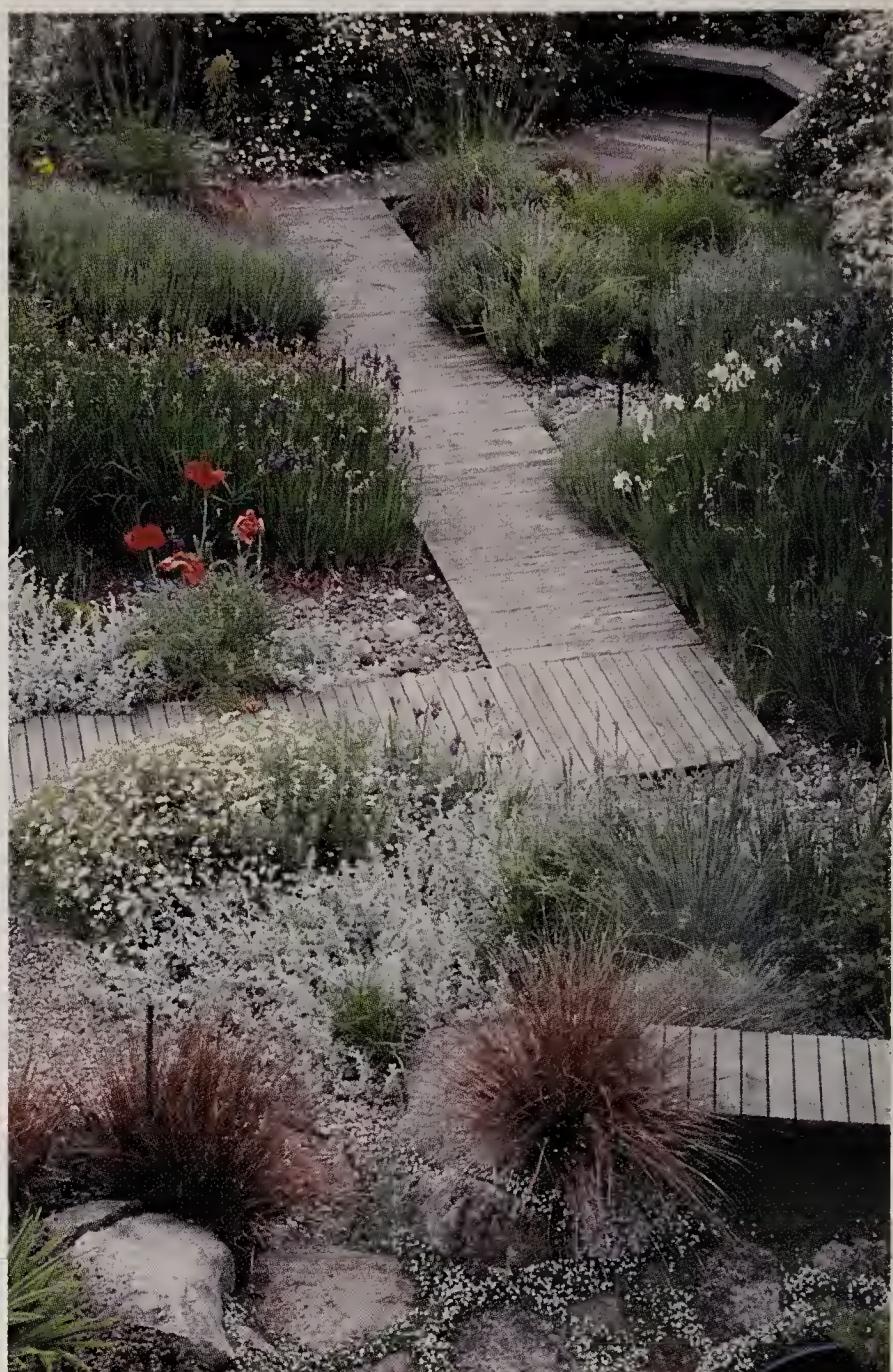
Plant Sources

A number of these plants are very rare in cultivation or are slow to propagate so that there are few or no sources for them. The best way to find plants in the article is to attend all of the spring sales at botanical gardens and arboreta. The following nurseries carry some of them.

Heronwood Nursery, 7530 288th NE, Kingston, WA 98346: *Rehmannia elata* (listed as *R. angulata*); *Petasites japonica* 'Variegata', and *Triosteum himalayanum*.

We-Du Nursery, Route 5, Box 724, Marion, NC 28752: *Rehmannia elata* and other *Rehmannia* species.

Forest Farm, 990 Tetherow Road, Williams OR 97544-9599: *Petasites japonica* 'Gigantea' (the large, wild form).



Shifting to Water-Sensitive Gardens

photos and text
by Jim McCausland

I was not surprised when, early this summer, I received a watering calendar from the utility that serves my part of Kitsap County. It made me think more about Washington gardeners I have met during the past couple of years who are shifting their focus from beautiful gardens to beautiful gardens that do not require much extra water.

They have taught me much about making water-sensitive gardens.

Covering Ground

Lawns, of course, are the garden's big water users, slurping up an inch of water per week from spring through fall. During our driest months—July and August—we get about an inch of rainfall per month. That leaves a 3-inch deficit.

Before you pay the price for that deficit, you should at least give the lawn the common-sense test: Think about whether you spend more time mowing, edging, feeding, weeding, and watering your lawn than you do using it. If so, maybe you should think about shrinking your lawn or looking for a more sensible ground cover. A landscape architect I know has a good rule of thumb for how much lawn to keep. He says that everybody should own at least enough turf on which to play badminton.

Photos (left, top to bottom):

The Winans family has created an impressionistic garden of lavenders in West Seattle. *Aster* is highlighted by the silver foliage of *Artemisia 'Livingstone'*.

(Right, top to bottom): Wooden pathways edged with drought-resistant grasses. Blue fescue and *Carex buchananii*. Tulips under staghorn sumac surrounded by *Senecio greyi* in Pat Morgan's garden.

Tim Holtschlag gave Pat Morgan a lawnless landscape on Maury Island. Pat lives on the southern tip of the island and gardens on sandy loam. Tim used thyme in the front garden, carpeting a small area that visually does the same job as grass. It gets almost no traffic and demands little water or care, though a dry stream bed (made so Pat would have something to do with the rocks she collects) suggests water.

In the rear garden, Tim has laid down a patchwork of irises, grasses, and ribbon grass, with taller ceanothus and rock roses around the edges. Stone and board paths get you through it all, with a satellite deck out on the edge. Though there is plenty of grass here, there is no lawn on the property. Yet garden visitors never miss it.

In other drought-tolerant gardens I have visited, turf's two-dimensional, expanse-covering job has been done well by other kinds of thyme (favored because it takes light traffic), kinnikinnick, and any number of ivies, hypericums, and vincas.

Sunset Magazine's Menlo Park, California, headquarters replaced bentgrass with *Rubus calycinoides* 'Emerald Carpet', which is covered with an amazing number of yellow-orange berries in early summer (the color takes some getting used to). Pat Morgan uses trailing African daisy (*Osteospermum fruticosum*) in her garden, expecting frost to take it out in winter. Each plant covers perhaps 3 square feet in a season, so it can be treated as an annual.

One of my all-time favorite lawn replacements is an impressionist-looking front garden in West Seattle. Gary and Kathy Winans have mixed thyme (there is no getting away from it) with large swatches of lavender. They used lavenders 'Hidcote', 'Munstead', the pink 'Jean Davis' and Spanish lavender, which is tender but comes back from seed after parent plants die out every winter.

If you have shade and the poor, acid soil that blankets so much of Puget Sound, the native mosses work well, too. You just invert your strategy; instead of raking the moss out of the grass, weed the grass out of the moss. Moss

takes light traffic, makes a perfect woodland ground cover.

Bulbs for the Region

The Mediterranean and the Middle East are full of bulbs (corms, tubers, etc.) that thrive in wet winters, dry summers. They do it by growing up in winter rains, flowering in early spring, and dying down as the rains taper off. Plants could hardly be better matched to our climate, as their popularity shows.

They have another thing going for them as well: Even the showiest, most heavily hybridized tulips, daffodils, and hyacinths do well here most years with no extra water. It is true that many will not perennialize (tulips and hyacinths, especially), but this happens for reasons that have nothing to do with rainfall.

Back in Pat Morgan's front garden, tulips are planted under staghorn sumac and surrounded by *Senecio greyi*. The effect is wonderful.

For perennializing drought-tolerant bulbs, I have always liked strong daffodils such as yellow 'Carlton' or 'Dutch Master' and the white, fragrant 'Thalia', as well as grape hyacinth. *Scilla*, of course, is another blue that is indestructible under trees.

Anemone (which itself comes from tubers) makes a good bulb companion. Blue *Anemone blanda* flowers go well with white daffodils and early red tulips as long as they have sun. Flowers close when there is too little light.

For woodland situations, try wood anemone (*Anemone nemarosa*). Grown in forest duff and filtered shade, it gets by and multiplies without much extra water. For the same situation, trilliums are also champions, self-seeding all over the place after a few years.

Where there is a little more light, go with Pacific Coast native iris. Bearded iris also does well most years on rainfall alone, but dying foliage looks pretty ugly in summer. I interplant my bearded iris bed with cosmos, whose lacy foliage hides the iris leaves as they go through their death throes.

South Africa's bulbs are generally a little tender for the Northwest. Though Cape Province, for example, is at San Francisco's latitude (albeit in the Southern hemisphere), its climate is more like that of the area between Santa Barbara and San Diego. Hardy bulbs do grow there, of course, like callas (they grow in damp places on the Cape) and *Babiana*; one of the most interesting genera for the Northwest includes fairy wand (*Dierama*

pulcherrimum and *D. pendulum*). The flower stalks really do look like wands—especially those of *D. pendulum*, whose hanging flowers just accent the likeness.

Bigger Than a Bread Box...

The grasses have really risen to the top during the past few years. That makes sense, given the general drought tolerance of the group (turf grass excepted). With most grasses, less water just means less growth, not shaggy looks.

When you bring these into the garden, it is wise to pay attention to the observation of a VanDusen Botanical Garden staffer: "The problem with grasses is keeping them out of each other." Once they have mixed, weeding is like trying to unscramble an egg. Keep different species well spaced.

My own favorites are perfectly named angel-hair grass (*Stipa tenuissima*), blue oat grass (*Helictotrichon sempervirens*), red Japanese blood grass (*Imperata cylindrica*), and *Miscanthus sinensis*. Pampas grass (*Cortaderia selloana*) is just fine—until you want to get rid of it.

Grays and Greens

Among perennials, gray- and green-foliage plants are versatile. Gray-foliage plants seem to be increasingly popular, probably because they go with almost anything. *Artemisia* turns up everywhere, especially 'Powis Castle'. The giant honey bush (*Melianthus major*) is much less common because it is tender, but its foot-long leaves and fast growth make it worth growing for even a season (it comes back from the roots after a freeze). *Senecio greyi* fits into the same category, but it is used differently: In the best stands I've seen, it is allowed to spread and become a taller-than-knee-high ground cover.

Plenty of herbs also fit in well here. A wide gravel path at the Filoli garden (near Woodside, south of San Francisco) was lined with a row of full-size English lavender plants that looked and smelled wonderfully good. *Santolina* also works well in both gray and green forms, used either as a lilliputian hedge or ground cover, and catmint is a standard.

Among green-foliage plants, the euphorbias really shine, but be careful; not all are drought tolerant. *Euphorbia characias*, *E. c. wulfenii*, *E. epithymoides*, *E. myrsinites*, *E. palustris*, and *E. rigida* are all good; *E. griffithii*, however, will not take drought.

Flowers for Low Water

For flowers, the ubiquitous *Erysimum* ×

'Bowles Mauve' is apparently popular because it almost always has a few flowers on it during the growing season. That is why I do not like it: I would rather have something that flowers all at once, then closes shop for the season.

The daisy family includes a huge number of choices. Like fleabane (*Erigeron karvinskianus*), asters should be in every garden, where their invaluable color carries the late season. My favorites are *Aster ericoides* and *A. × frikartii* (see cover). Then of course there is *Coreopsis*, gloriosa daisy (*Rudbeckia*), and blanket flower (*Gaillardia*); you will run out of garden space before you exhaust the list.

Planting and Growing

Fall planting makes the most sense, since fall and winter rains do the irrigating for you and give plants a well-rooted head start for the following summer.

Against the conventional wisdom, I favor heavy soil amendment to prepare the general planting site for most plants. Though it is true that nursery stock adapts quickly to unamended native soil, it is also true that mineral native soil will not hold as much water as the same soil well amended with organic matter. That is especially important in Puget Sound's glacial till.

Dan Borroff, a Puget Sound authority on drought-tolerant gardens, has a system I love: When he installs a landscape, he blows a thick (several inches) layer of organic matter over the whole site (I have seen him do it to an entire residential lot), then tills or digs it in before planting. Such widespread soil amendment precludes the common bathtub effect, in which roots never grow out of a planting hole backfilled with amended soil and surrounded by relatively hard native soil. The process increases organic matter site-wide and gives all roots, from those of the largest oak to the smallest perennial, plenty of room to grow through soil that holds water well.

In addition to this (especially where adjacent plants will not allow widespread soil amendment), a layer of mulch also helps hold in moisture, and eventually it works into the soil below. It is the way nature does it, and it works just as well in the water-sensitive garden.

Jim McCausland is staff writer for *Sunset Magazine* and a member of The Arboretum Foundation board of directors.



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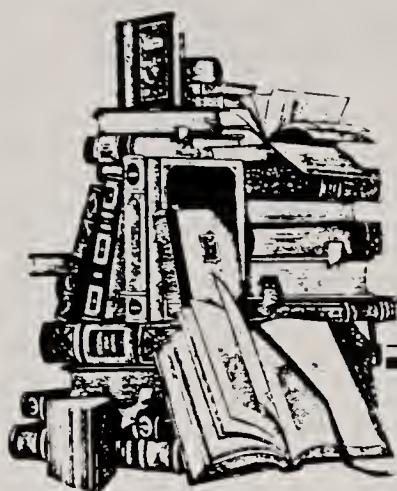
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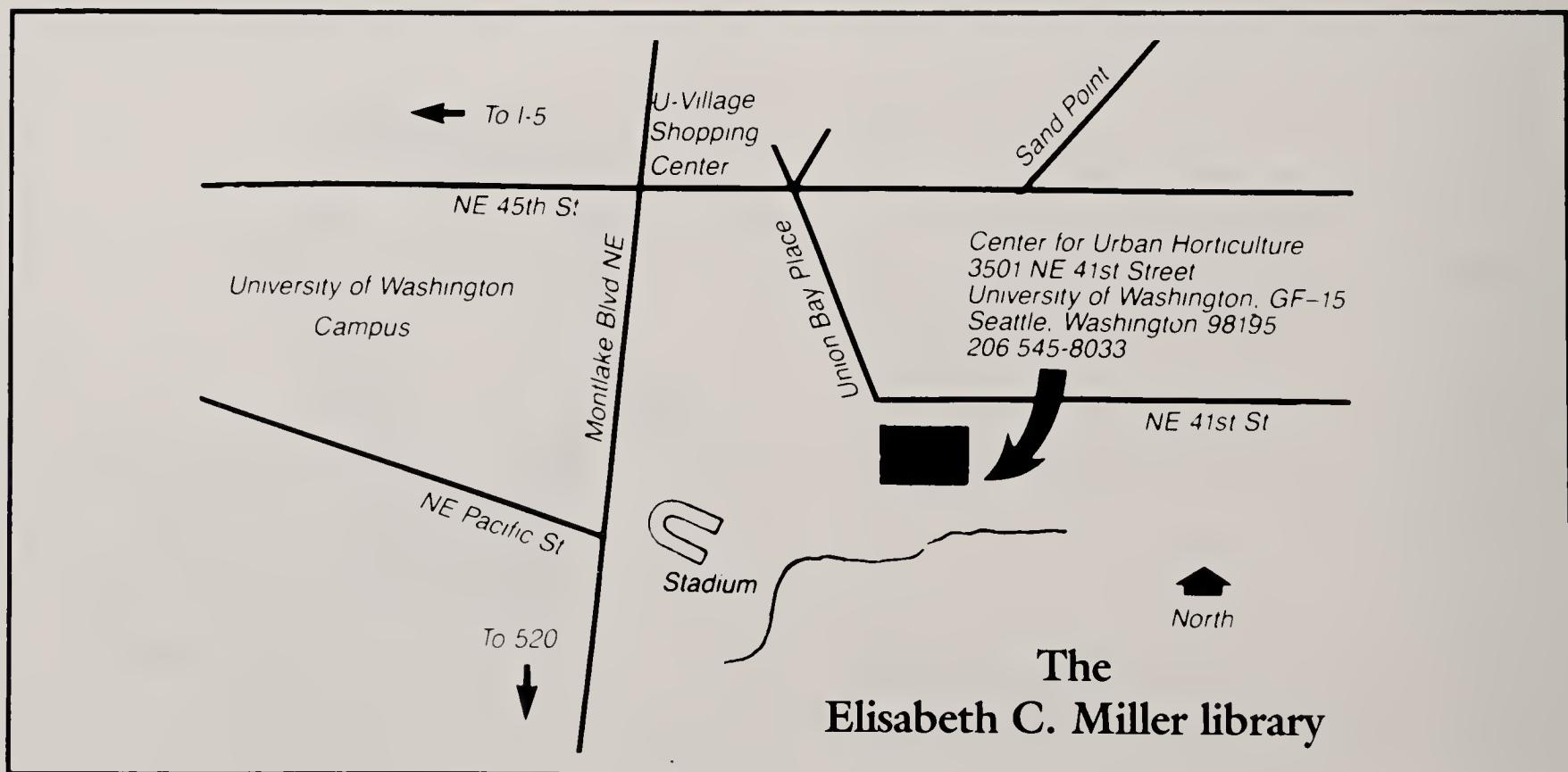
The artfulness of gardeners, gardens, and gardening books are combined in several new works from both sides of the Atlantic.

Dillon, Helen. *The Royal Horticultural Society Collection: The Flower Garden*. London: Conran Octopus, 1993. ISBN 1-85029-369-4. Both the beauty of Helen Dillon's Dublin garden and her practical experience are captured in this first book on flower gardening to be published with The Royal Horticultural Society. She is a master at growing and combining plants, discussing balance, color and texture throughout the seasons. The section on "key plants" gives cultural requirements and suggested companions as well as personal and knowledgeable advice on growing both common and unusual perennials. There is plenty of information to interest the experienced gardener in this particularly well-photographed book, but it is also written to be of great use to the beginning gardener.

Fell, Derek. *The Impressionist Garden*. New

York: Carol Southern Books, 1994. ISBN 0-517-59851-5. As if anticipating this gorgeous new book, Van Gogh said: "Ah, what portraits could be made from nature with photography and painting." Derek Fell has juxtaposed photos of Impressionist paintings from the mid-nineteenth century with photos of today's gardens to show similarities of color and design. Planting plans are included for specifics on how to create the lush color harmonies and romanticism of the gardens beloved by Monet, Cezanne, Manet, and their fellow Impressionists. The most interesting and unusual chapter is on the influence of Japanese art, with its paintings of bridges, chrysanthemums, and cherry blossoms, upon the aesthetics of the nineteenth century, and on garden makers of today.

Streatfield, David C. *California Gardens: Creating a New Eden*. New York: Abbeville Press Publishers, 1994. ISBN 1-55859-453-1. David



Streatfield, chair of the University of Washington Department of Landscape Architecture, has written a thorough and wide-ranging study of California gardens. Private and public gardens past and present are analyzed in text and numerous photographs. Here are the expected mission gardens, the excesses of San Simeon, and the understated terraces and pools of Thomas Church, but these are only a small part of California's garden history. The diversity of topography, styles, and plant material is well illustrated with examples of wildflower meadows, hillside gardens of stone and succulents, romantic gazebos dripping with roses, and the exotic—nearly surrealistic—gardens of Lotusland.

In his final chapter, "Old Realities, New Possibilities," Streatfield discusses issues of development, drought, preservation, and restoration that will determine the future of gardens everywhere.

Also New

Hinken, Jorie. *Ecology for All Ages: Discovering Nature through Activities for Children and Adults*. Old Saybrook, CT: The Globe Pequot Press, 1994. ISBN 1-56440-138-3.

Kennedy, Des. *Crazy about Gardening: Humorous Reflections on the Sweet Seductions of a Garden*. Anchorage: Alaska Northwest Books, 1994. ISBN 0-88240-451-2.

Matheny, Nelda P., and James R. Clark. *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas*. 2nd ed. Savoy, IL: International Society of Arboriculture, 1994. ISBN 1-881956-04-0.

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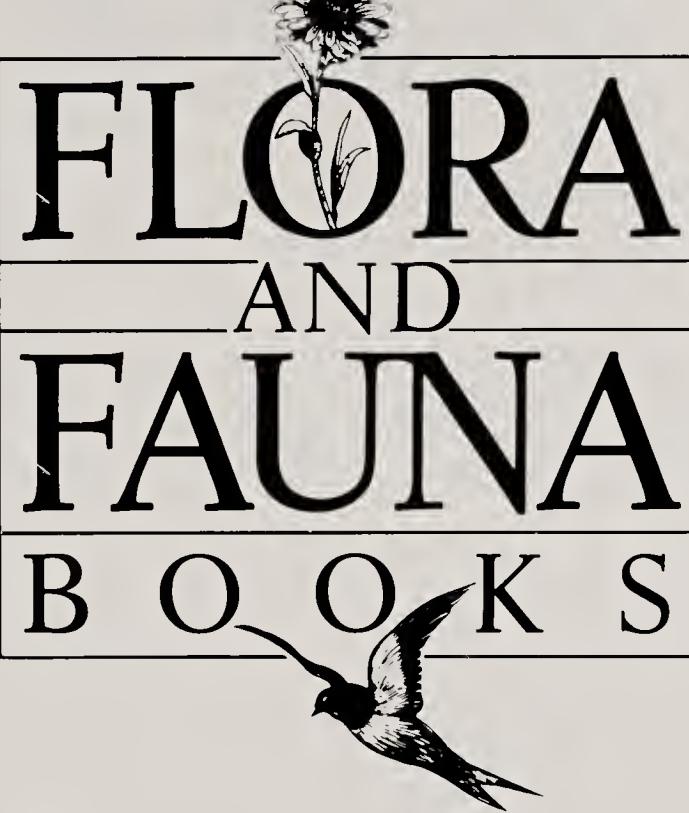
Freelance writer Valerie Easton is a librarian at the University of Washington Center for Urban Horticulture and book review editor of *The Washington Park Arboretum Bulletin*.



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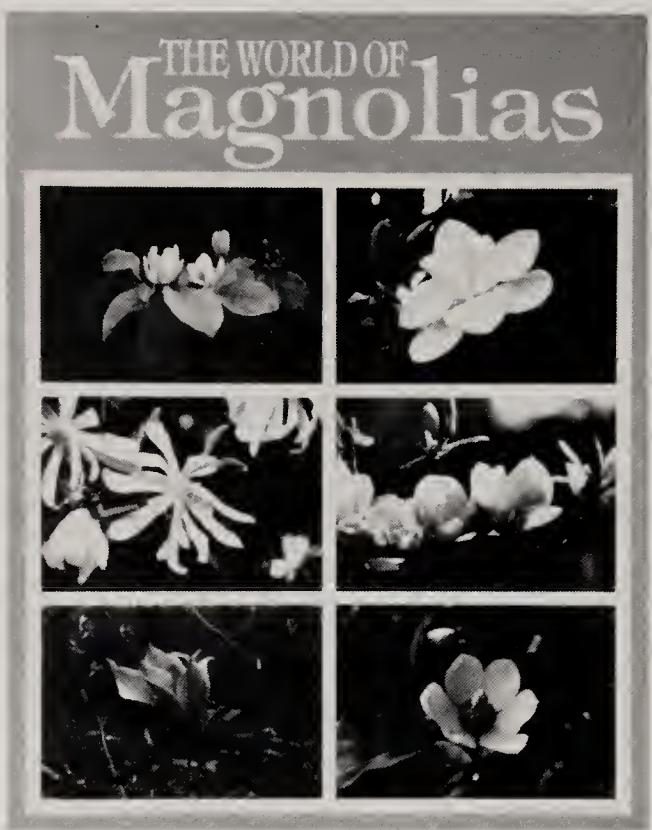
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Errata

Volume 57, No. 1 (spring 1994) had two errors. In the table of contents, a black-and-white photo of *Erythronium* was identified as *Erythrina*. On page 11, the *Crataegus* (hawthorn) should have been *× mordenensis*. Although all nomenclature had been proofed or identified by experts, such errors occur. Please send your challenges, changes, and sources to the editor.

Book Reviews



The World of Magnolias. Dorothy Callaway. Portland, OR: Timber Press, 1994. One hundred forty-two color plates plus 45 line drawings and black-and-white photographs. ISBN 0-88192-236-6. \$44.95, hardcover.

This thorough account of the entire genus *Magnolia* was written by the registrar of the American Magnolia Society, who lives in Georgia. Within ten chapters, *The World of Magnolias* assembles information about all known species, including those from the American tropics, which cannot be grown in the Northwest. Descriptions of the species cover 101 pages and form the major portion of the book. In addition, all recorded hybrids are listed following each species and are fully described in two sections of a separate chapter—first, those with published Latin names, of which there are only seven, then those with English names.

The list of hybrids with English names (127) is a most useful source about their breeding and origins. Although most of the principal hybridizers (Chapter 9) are American, some good plants have come to the Northwest region from Great Britain and New Zealand and are mentioned in the text.

A noteworthy hybrid detailed in the book is *Magnolia × soulangeana*, the early blooming magnolia erroneously known as the tulip tree. Alone, *M. × soulangeana* has 44 named clones ascribed to it. Only *M. grandiflora* has more cultivars than that in the genus. Although spelled dif-

ferently in this book (and in the Arboretum's new book), the spelling of *soulangeana* should be after Frenchman E. Soulange-Bodin.

The 142 color plates are mounted together near the center of the book. Although there is no index or list, they are arranged alphabetically and grouped by species, then hybrids. The plates vary greatly in size but are usually three or four per page. Those given half or full pages are very beautiful flower portraits, though not always helpful in making identification easier (an example again being the rose-red or near purple forms of *Magnolia × soulangeana*).

Throughout the book, more on magnolia flowering periods would be helpful, in conjunction with flower color and form, as Gerd Krüssmann has attempted to do in the English edition of his frequently consulted 1986 *Manual of Cultivated Broad-Leaved Trees and Shrubs*. *Magnolia wilsonii* was omitted from the charts of flowering times; in Seattle, it is the first half of May, preceding the related *M. sieboldii*.

Lists of references and additional reading are placed at the end of each section, with a general bibliography of ten pages at the end of the book, which is very wide ranging and especially useful to students of the genus.

For magnoliaphiles, this is going to be an essential reference work for many years to come, especially since all previous books on this subject are now out of print and hard to find on booksellers' lists.—*Brian O. Mulligan*

Brian O. Mulligan is director emeritus of the Washington Park Arboretum and a member of the *Bulletin* editorial board.

Flora of North America. Flora of North America Editorial Committee. Vols. 1 and 2. New York: Oxford University Press, 1993. ISBN 0-19-505713-9.
\$40 per volume, hardcover.

The word *flora* has two distinct definitions. First, it collectively refers to the group of plants found within certain geographic boundaries. Here, however, it refers to a treatise that lists and describes the plants known to occur within those boundaries. Given these definitions, you might suspect that *Flora of North America* is an ambitious project, and correctly so.

Portions of North America already have good regional floras, including the *Flora of the Pacific Northwest* by C. L. Hitchcock and A. Cronquist. Regional floras can be unsatisfactory, however, because while they provide information about the plants within the region, they give no information about those species or related species beyond the regional borders.

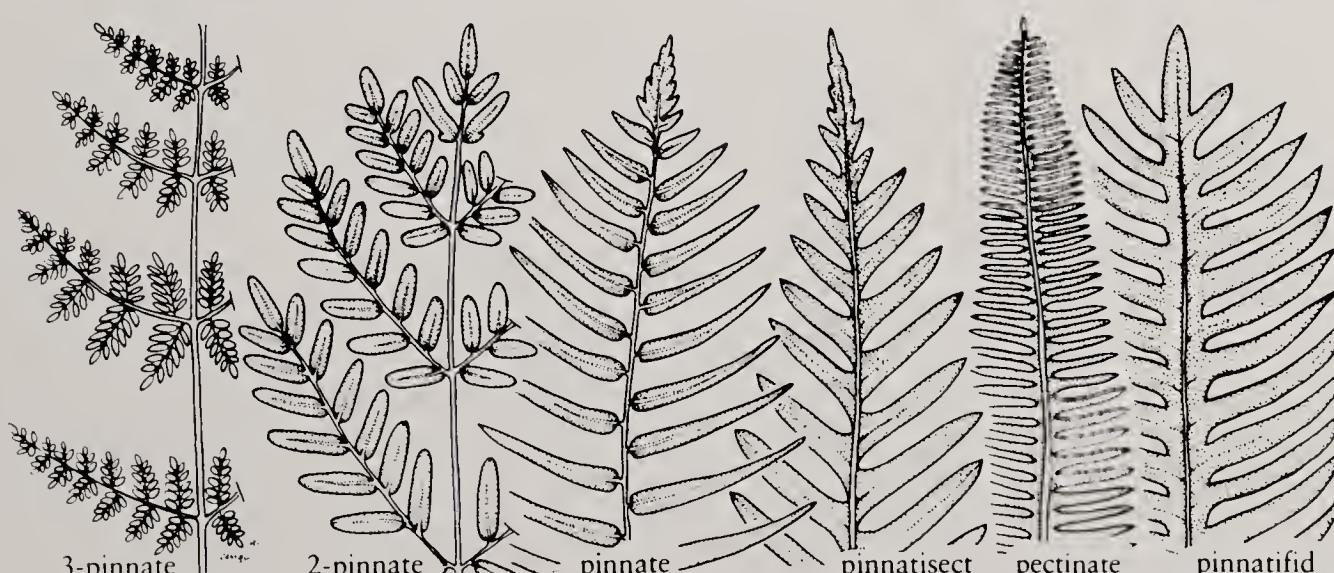
This North American flora was proposed after the 1964 announcement of the *Flora Europaea*, but it was 19 years before action was taken. In 1983, a number of institutions committed support and the project began. Although 14 volumes are planned, at this time only the first two volumes have been published. The first volume includes chapters by various authors on the physical setting of North America, paleofloristics (the study of past distributions of plants and plant associations within a given region), vegetation, contemporary vegetation, and an excellent section on plant classification. In particular, I found the chapter on climate and physiography (the study of the physical factors that affect the prevailing conditions within a habitat and the distribution of plants and animals) to be inclusive and easy to read. In contrast, the chapter on ethnobotany (the study of how plants are used by indigenous people) and economic botany was disappointing. It will satisfy novices, but those familiar with the subject will find it cursory. Perhaps the most interesting chapter involves the history of floristics (the science of putting together and identifying flora of a particular area) in North America. The inside stories on the major names of botany make it entertaining, and photos of most of the individuals are included. This volume is a comprehensive view of North American biogeography and taxonomic history. I know I will find it indispensable in my library.

The second volume begins the taxonomic treat-

ments with pteridophytes (ferns and fern allies) and gymnosperms. As with the first volume, it rises to the task handsomely. The keys to the genera and species do not rely on technical characters (e.g., those requiring a microscope) and are easy to use. Those with only a modest knowledge of taxonomic terms should have no problems. The species are well described, with the name of each characteristic boldfaced so that if you wish to check a particular plant character (e.g., fruit) you can find it quickly. There are, unfortunately, few illustrations of the plants included except for a limited number at the beginning of each genus heading. For those of us that have been known to key using the excellent illustrations in the *Flora of the Pacific Northwest*, this is a disappointment. I do, however, approve of the geographic range maps included with each species, although they are so tiny that species with discontinuous distributions sometimes appear continuous.

When this project is completed, it will include 14 volumes. As you read this, volume three, the Magnolidae and Hamamelidae, has gone to press. A new volume will be published every two to three years, with completion of volume 14 expected in 2002. Given the constant changes in taxonomy, by the time the last volume is published, there will be numerous name changes needed in the earlier volumes. Fortunately, a computerized data base is being produced simultaneously. This should facilitate changes in the future and ensure the continued utility of the *Flora of North America*—Sarah Hayden Reichard

Sarah Hayden Reichard is completing a Ph.D. at the University of Washington's Center for Urban Horticulture (CUH). Her dissertation is on the biology of the invasive woody plants of North America. For the last several years, she has managed the CUH herbarium and has taught taxonomy at the University of Washington.



Leaf division in ferns. From *Flora of North America*, volume 1.

In the Washington Park Arboretum

by John A. Wott



Photo by Jordan Reams,
University of Washington Photography

Stop by the New Information Desk

The new reception desk in the lobby of the Graham Visitors Center has features that help attendants offer better information. For example, you will more easily be able to see areas of interest on a new map with four seasonal overlays, which will be added soon. Produced by Promotion Products, Inc., Portland, Oregon, it complements the colors and design in the gift shop. Arboretum Foundation members Carol Simons and Sheila Taft have helped nurture the project since its inception.

Waterfront Trail is in the Chips

The Waterfront trail through Foster Island is now much more walkable when Lake Washington is at its highest level. Through efforts of Deborah Holland, Executive Director of The Arboretum

Foundation, and the Seattle Rotary Club, the trail was raised and then filled with a new layer of wood chips. The Washington Forest Products Association donated \$2000 to the project, and Rotarians wheeled in the chips. The renovation was supervised by the Arboretum's senior gardener, John Candy, Seattle Department of Parks and Recreation.

Cytisus Collection Renovated

In early June, the *Cytisus* Collection, located in the Legume area, was renovated. Several overgrown, unknown plants were removed. Now you will be able to see six replacement *Cytisus* species that propagator Barbara Selemont grew from wild-collected Mediterranean seed. These brooms are related to *C. scoparius*, the weedy Scotch broom, and are known for their fragrant, sweet pea-like

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Make your visit to the Washington Park Arboretum more rewarding by using an invaluable resource. *The Woody Plant Collection in the Washington Park Arboretum*, our new catalog, will show you how to find the plants you are looking for, including those mentioned in the *Bulletin*.

Grid number. In the book, next to each plant name is a grid number, e.g., *Cytisus glaber*, 15-6E. Turn to the fold-out map to locate the plant using the grid number coordinates.

Acquisition number. Once you locate a plant on the Arboretum grounds, find a green plastic tag (metal on older versions) with plant name and number, e.g., *Cytisus glaber*, 155-92. The first digits indicate what order it was acquired in a given year; the second numerals are year of acquisition (in the twentieth century).



Joy Spurr

Cytisus battandieri, an early member of the Washington Park Arboretum's growing *Cytisus* collection.

flowers and need for little water.

We already have plants of *Cytisus battandieri* (292-92), also known as Atlas broom, which has yellow flowers, and *C. grandiflorus* (87-92). Several more species are being evaluated at the Center for Urban Horticulture nursery and, if proven worthy, will be added to the collection this fall.

Four *Cytisus* species are new to the collection. In parentheses are acquisition numbers (the second two digits are year of acquisition) followed by grid numbers to help you locate the plant. See the box for information on using these numbers to help you during your Arboretum visit.

Cytisus glaber (155-92; grid 15-6E) is a native of southeastern and central Europe.

Cytisus hillebrantii (91-92; grid 16-SE) was wild-collected in Spain, and we have two plants.

Cytisus striatus (101-92, 85-92; 16-6E) is found in Portugal and western and central Spain.

Cytisus villosus (102-92, 86-92; grid 16-6E) is a native of southern Europe. Its yellow flowers have a dark red base.

contains 41 species, tying us for first place in numbers with the Arnold Arboretum, Jamaica Plain, Massachusetts. We have taxa from Algeria, China, Japan, Korea, Mexico, Morocco, Sicily, and Turkey, as well as North America. Fifty species are known to be hardy here.

Six of the Arboretum's *Abies* species are on endangered species lists. They are:

Abies fraseri (Fraser fir) (184-59; grid 37-1W) is a native of the southeastern United States. This attractive silver fir was first introduced by John Fraser, for whom it is named. It was found in large forests at elevations of 4000-6000 feet.

Abies koreana (Korean fir) (653-39; grid 40-5W), prized for its purple cones, was first found by Père Faurie in 1907 on Quelpart Island, Korea, where it was abundant at 3000 feet and over.

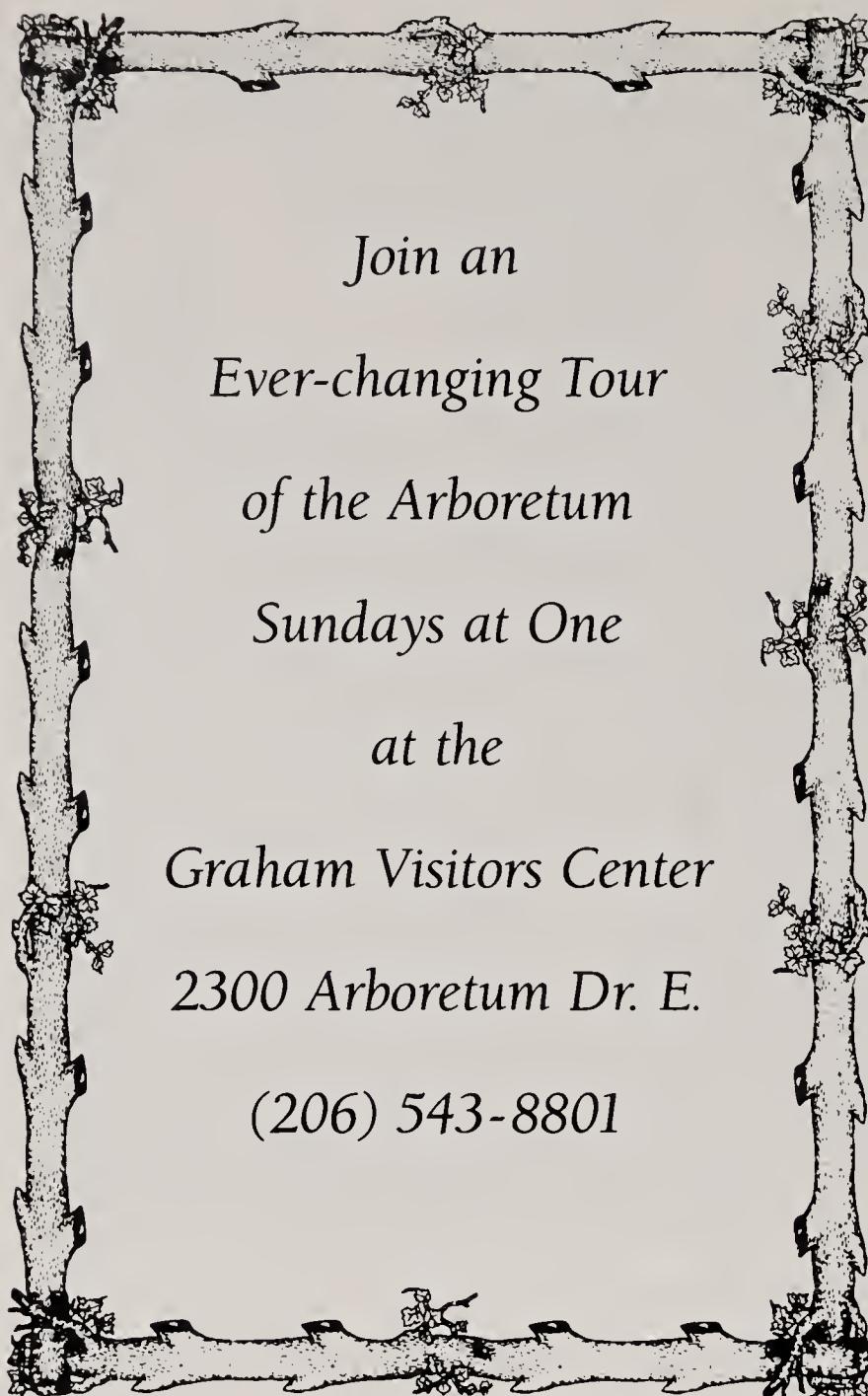
Abies marocana (Moroccan fir) (122-68; grid 8-2E) is a small tree, first found on the mountains south of Joly in 1906.

Abies nebrodensis (Sicilian fir) (369-54; grid 5-2E) was once widely distributed on the mountains in northern Sicily.

Abies numidica (Algerian fir) (11-61; grid 8-2E) is a native of Mt. Babor in Algeria where it

Fir Collection Pest Problem Being Treated

The Arboretum collection of true firs (*Abies*)



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grows in association with *Cedrus atlantica*, which also can be found in the Arboretum.

Abies pinsapo (Spanish fir) (749-49; grid 6-1E) is a native of Spain on the mountains about Ronda, always found on limestone. It is often said to be "the most distinct and unmistakable of the firs."

Our fir collection is threatened by an infestation of the balsam woolly adelgid (*Adelgis piceae*), which is related to aphids. Washington State University entomologist Arthur Antonelli first diagnosed our problem in 1993, and he told us that most trees that do become infested will die.

Christina Pfeiffer, Arboretum horticulturist, has been researching adelgid control methods. Like aphids, the adelgid attaches to the bark, inserting a feeding tube and literally sucking the sap out of the tree. There are several generations per year.

This spring, Dean Powell (plant technician and pest manager) has been carefully monitoring the infestations, which are now quite severe on a number of trees. Spring spraying of insecticides with power equipment near time of bud break is recommended. However, our trees are adjacent to many flowering plants, and we do not want to endanger any bees. As an alternative, Powell has

been repeatedly applying insecticidal soap, which so far appears to be very promising for control.

The new diagnostic equipment donated by units of The Arboretum Foundation has been immensely helpful in trying to save our valuable *Abies* collection.

Tour Program Again Hits Its Stride

For adults and children. From March through June, Arboretum tours concentrated on native plants, what was in bloom, and the Foster Island sanctuary. Thirty-seven guides led 94 tours that reach 660 persons, approximately split between children and adults. Nancy Hamilton, temporary tour coordinator, organized, supervised the training (conducted by Sheila Taft, volunteer and vice-president for Administration of The Arboretum Foundation), and worked with Becky Varon, volunteer, who assisted with scheduling.

The giggles of saplings return. An abbreviated Saplings Program, which consists of educational tours for grade schools, returned to the Arboretum for one week in May. Nancy Hamilton capably organized and taught 143 children from five schools in the two-hour program. Several volunteers assisted with the seed planting event, and the children took home brightly decorated containers planted with nasturtium seeds.

American Association of Botanical Gardens and Arboreta (AABGA) Meeting

In June, the Arboretum was well represented at the national meeting of AABGA, held in Pasadena, California. Those attending from the University of Washington were John A. Wott, director of Arboreta; Christina Pfeiffer, horticulturist; and Tracy Omar, assistant curator. Attendees from The Arboretum Foundation included Debra Holland, executive director, Phillips Wood, fourth vice president; and Deborah Andrews, treasurer of the Arboretum Foundation's Unit Council. The sessions offered Arboretum staff and volunteers new information on issues of plant diversity, conservation, plant materials, working with volunteers, funding, and master planning.

John A. Wott, Ph.D., is director of Arboreta, Washington Park Arboretum, and professor of Urban Horticulture, Center for Urban Horticulture, University of Washington, Seattle. The University of Washington is responsible for managing the collections and the associated arboretum programs and works cooperatively with City of Seattle and The Arboretum Foundation.



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